Open Access Developments in France: the HAL Open Archives System

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ABSTRACT :This article presents an overview of Open Access publishing and Open Access archiving in France. In natural sciences, most articles are published in international journals; authors must therefore comply with the policies of their publishers, irrespective of their nationality. For humanities and social sciences, where publication tends to be distributed among many small journals, portals have been created to provide electronic publishing, with varied access policies. Open Archives repositories have been in existence in France since 2001; from 2006, a proactive policy led the main research agencies and universities to coordinate their actions towards a common archiving platform, HAL (Hyper Articles on Line), operated by CNRS (Centre National pour la Recherche Scientifique) , with individual portals, either thematic or institutional. HAL stores now the majority of OA records – presently some 10% to 15% of French output – and is growing almost exponentially.
An updated list of French Open Archives repositories is presented in the Appendix,
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Introduction

A new law on authors' rights occupied the French Parliament in late 2005 and early 2006. It was intended as a long-overdue national implementation of a 2001European Directive; it led to heated discussions, both in the parliamentary debates and in the media. However, science and research were absent from the debates, which were totally dominated by a concern for the protection of musical works against electronic illegal copying. The only reference to research came when discussion turned to the article on exceptions to the copying restrictions, in favour of education and research, which were strongly rejected by government. Three years earlier, when the Conference of University Presidents issued a statement calling for some flexibility on this matter, a group of publishers reacted in the press[1,] deprecating [freely accessible documents] 'published on paper or online, without remuneration or even at the author's expense', terms which suggested a surprising ignorance of the ways of science[2].

These introductory remarks set the stage for any discussion about the political, cultural or economic aspects of science publishing. The theme of Open Access (OA)[3] is not a matter of debate in the media or at government level. However, some progress has been made, originating from the scientific community, and now supported by research councils such as Centre National pour la Recherche Scientifique (CNRS) and others, by the Académie des Sciences, Universities and Grandes Ecoles (higher engineering and business schools), and more lately by the Ministry of

Education (see Table 1).

Table 1 - Some Research Councils and Agencies in France and their Acronyms

Acronym	Agency	Area of intervention
CNRS	Centre National de la Recherche Scientifique	Covers all disciplines, with subsidiaries
IN2P3	Institut National de Physique Nucléaire et de Physique des Particules	Subsidiary of CNRS; covers nuclear and particle physics
INSU	Institut National des Sciences de l'Univers	Subsidiary of CNRS; covers astronomy and earth sciences
INIST	Institut National de l'Information Scientifique et Technique	Service unit of CNRS, in charge of scientific information and communication
CCSD	Centre pour la Communication Scientifique Directe	Service unit of CNRS, in charge of development and operation of the HAL platform
INRA	Institut National de la Recherche Agronomique	Agriculture and food production
INRIA	Institut National de la Recherche en Informatique et Automatique	Computer sciences
INSERM	Institut National de la Santé et de la Recherche Médicale	Medical and health research
IFREMER	Institut Français de Recherche pour l'Exploitation de la Mer	Oceanography, marine biology, etc.
CNES	Centre National d'Etudes Spatiales	Space Sciences
CEA	Commissariat à l'Energie Atomique	Nuclear energy research and applications
CEMAGREF	Centre national du Machinisme Agricole, du Génie Rural, des Eaux et des Forêts	Agricultural and environmental engineering research
CIRAD	Centre de Coopération Internationale en Recherche Agronomique pour le Développement	Agricultural research centre for international development
IRD	Institut de Recherches pour le Développement	Research and programmes on sustainable development of the countries of the South,
CPU	Conférences des Présidents d'Université	University Presidents' Conference
CGE	Conférence des Grandes Ecoles	Engineering and Business Schools Directors' Conference

Open access publishing and French scientific publishers

The scientific output of France is significant, but its status differs between the natural sciences – including mathematics – and the humanities and social sciences (HSS).

Physical and life sciences

As of 2004, France ranked sixth, behind USA, Japan, UK, Germany and China with 36,000 articles, 4.7% of total world publications, and with particular strength in certain fields such as mathematics, where it goes up to 7%[4]. The increasing trend towards internationalisation and consolidation in the industry makes it difficult any longer to assign a precise French origin to a journal. Most French research is published in international journals. French publishers, although very powerful in other domains, have largely abandoned scientific publications; most French peer-reviewed research journals have disappeared from the scene, often absorbed by international publishing houses. For example, those formerly published by the Société Française de Chimie merged with journals from other European chemical societies; they are now published by Wiley-Blackwell, and comply with its rules for OA. Even the venerable *Comptes rendus de l'Académie des Sciences* is now in the hands of an international publishing house.

The largest independent commercial publisher is EDP Sciences, an offshoot of the Société Française de Physique(SFP), presently owned by SFP, Société Française de Chimie and Société de Mathématiques Appliquées et Industrielles. EDP Sciences publishes 37 journals, in the fields of astronomy, physics, mathematics, life sciences and recently medicine. Some of these titles are co published with other European publishers or societies. EDP places much emphasis on developing a partnership with researchers and gives attention to electronic publishing, envisioning the transition to full e-publishing. The publisher has a *'copyright provision enabling self and institutional archiving, free-access articles with "Latest article Free", "Press Release" or "Open Access Initiative", free archives after a period of embargo'*.

All EDP Sciences journals have an electronic edition, each of which has its own policy on Open Access. Some various policy trials are running. For example:

- A preprint can be deposited in the HAL archives server of CNRS (see below), and, at the author's choice, will be automatically submitted from HAL to the *European Physical Journal* for review and publication.
- Some journals are in the process of instituting the 'author/institution pays' scheme ('gold' journals), at the author's choice, with a promotional low fee for 2007 of €300-450 € per article.
- For two EDP journals, the articles are freely accessible online for 15 days following e-

publication.

- Some projects of full OA journals are under evaluation.

EDP Sciences is an associate member of ALPSP and participates in the FAO programme AGORA, providing free access to agriculture and food research for users in low resources country. EDP's aim is to *'further extend the publishing platform in a concept of partnership with the scientific communities'*

Other French scientific publishers produce books and/or non-refereed journals; many are affiliated with international companies, whose policies they follow. The ROMEO list[5] of OA publishers, both 'gold' (allowing immediate free access to published content, under the 'author-institution pays' scheme) and 'green' (allowing self-archiving by authors), only lists, for France, EDP and one geology publisher as 'green', and does not quote any life science or medicine journal. On the other hand, the excellent site Bibliovie[6], operated by CNRS, lists about 30 French OA journals, among an exhaustive listing of some 4,000 journals in life sciences, about half of which allow some forms of open access. The discrepancy probably arises from the way that ROMEO builds its listings, using the copyright rules communicated by publishers; many small self-published journals simply do not have rules for copyright, and do not object to photocopying or electronic reproduction of published articles..

Humanities and social sciences

The situation in HSS is more difficult to describe, since most publishing is not through peer-reviewed journals; a large proportion appears in books and the remainder in journals of limited circulation and often of short lifespan, frequently associated with universities and learned societies. An interesting review can be found in the book by Thierry Chanier[7]. A precise survey is difficult to present, due to the multiplicity of media and to the variety of their publishing policies. The yearly output of French HSS publications is not easily available; a rough estimate might be 40,000 printed notes and articles per year, original research articles accounting for only a few thousands. E-publishing, as a newcomer, is more structured, concentrated around a few e-publishers and portals, public or commercial. A recent initiative by CNRS (March 2007) is expected to clarify the landscape, as well as giving more means to HSS communication. The Project ADONIS[8], qualified as a 'Very Large Facility (*Très Grand Equipement*)', in the same class as the very large instruments of astronomy or physics, was created in 2005, but its roadmap

was updated in 2007. It is now designed as a platform providing HSS researchers with '*digital archiving, working, signalling, distribution and communication tools*'. The publishing sector will be handled by a 'Center for open electronic publishing (CLEO)', a service unit of CNRS, located in Marseille.

With the support of CNRS, EHESS (Ecole des Hautes Etudes en Sciences Sociales), Université de Provence (Marseille) and Université d'Avignon, CLEO operates *Revues.org*[9] a portal hosting already some 70 journals, increasing soon to about 200.. Each journal retains its own individuality : editorial policy, layout and access mode. The portal supplies technical support, publishing software, indexing and search tools. Those journals with only e-publishing are fully on open access, while those with mixed electronic and paper editions use a 'mobile wall' scheme for non-subscribers. The embargo period, after which access is free for all, is usually about 24 months but can extend to 5 years. This delay, much longer than for natural sciences, where it rarely exceeds 6 months, corresponds to the larger lifetime of SSH articles, ranging from a few years to decades, or more, according to the discipline. Some 20000 full text documents are now online on *Revues.org*. The number per journal varies from a dozen to a few thousand, mostly in French, but English, Spanish, Portuguese texts are accepted. Self archiving on institutional repositories by authors of texts submitted for publication is usually not allowed, while post-scripts can be deposited for many journals. A partnership with the HAL-SSH archives is considered. *Revues.org* is compatible with the OAI-PMH protocol for data sharing and is referenced by the usual search engines; although it acts as a publisher, it is listed as an open repository by the ROAR and DOAR lists of Open Archives repositories.

Other websites, based in France, follow similar lines, serving SSH research. *Persée*[10] is a service of the Ministry of Education (libraries directorate), run by University Lumière Lyon 2. It is dedicated to the digitisation and online distribution of back collections of a corpus of presently 22 periodicals, on immediate or delayed open access, with a moving wall for some.

CAIRN[11] is a joint venture between four commercial publishers, the Bibliothéque Nationale de France, and the Centre National du Livre. It provides services for print and e-publishing to 120 francophone periodicals, not all of them research journals. They have different access policies, from subscription, pay-per-view, delayed access to full open access. Other cross disciplinary institutional sites offer access to publications ; they are listed in the Appendix.

HSS authors often contribute to collective works, through commercial book publishers, each with its own access policy. Individual re-use of a contribution by the author, including self-archiving in a public repository is permitted by some publishers.

Digitisation of older documents

As remarked above, while in the physical and life sciences the active life of a research article is often short - less than 5 years - in HSS it can extend to decades or more; thus retro-digitizing older documents is an essential activity. Although some general repositories can host this type of document, special sites have been created, such as '*Bibliothèques virtuelles Humanistes*', dealing with Renaissance studies, or *'Histoire et Mémoires de l'Académie royale des sciences*', a collection of 18th-century proceedings from the Académie des Sciences, in a sub-repository of HAL (see below). *NUMDAM*, funded by CNRS, is responsible for digitising classical mathematical or cross-disciplinary texts with mathematical relevance, with some 20,000 entries so far. Even though it is not strictly Open Access publishing, mention should be made here of *Gallica*, a project responsible for digitising parts of the collections of the Bibliothèque Nationale de France (BNF); it currently has some 90,000 records, and is seen as the precursor to an even more ambitious project, '*Europeana*'. Such retro-digitisation portals are often considered to be Open Archives repositories; they are not, strictly speaking, self-deposit archives, but they play a sufficiently important role to be mentioned here.

Open Access And Self-Archiving

In the past decade, physicists and mathematicians, in France as elsewhere, have learned to use the document server ArXiv, and they now routinely deposit their written works there, often in parallel with conventional publication[12] through the peer-review process. Several types of documents - manuscripts of articles submitted to refereed journals, copies of published articles, notes and reports not intended for publication - are all found in the repository. The success of ArXiv led the CNRS , which operates a mirror site[13], to consider creating its own repository on the same model. At the same time, librarians and information managers - facing the rising cost of subscriptions and the accumulation of printed pages on their shelves - were seduced by the convenience offered by electronic archiving of publications and by retrieval tools.

In 2000, the CNRS created a service unit, the 'Centre pour la Communication Scientifique

Directe' (CCSD), under the leadership of Franck Laloë, a physicist at the Ecole Normale Supérieure. The road map for the new unit included *'improvement and extension of techniques allowing direct communication between researchers over the world, through freely accessible document databases'* . It was presented as a revival of the spirit of 18th-century direct exchanges between scholars[14], enhanced by all the power of the new technological resources. The starting point was to build a new repository for French researchers, improving on physicists' experience with ArXiv and extending its coverage to other disciplines. It soon became clear that a national system needed to be developed, with its own tools. In 2001 *'Hyper Articles on Line*' (HAL - a nod towards the onboard computer of 'A Space Odyssey'?) was opened as an online archive for CNRS.

At about the same time, other archives were being created by individual university departments, laboratories and institutes. In 2002, five article repositories, currently containing a total of some 2500 records, were created by the Animal Physiology and Livestock Systems Department of INRA-Tours[15], Université Lyon II, Institut Jean Nicod, @rchiveSIC (an information sciences portal) and the Ecole Normale Supérieure de Lyon (HSS). There are also two repositories of doctoral theses, PASTEL and TEL, which now contain some 7,000 theses. However, most of the early creations were isolated initiatives, driven by pioneering individuals, but not linked to any national project, and without any incentives from academic or research authorities.

One step forward occurred in October 2003 with the signature of the Berlin declaration, supporting the principle of OA, by the directors of CNRS, INSERM, INRIA (see Table 1 for acronyms); Institut Pasteur, INRA, EPHE, IRD, CEMAGREF and CIRAD joined them later. .

During the period from 2003 to 2005, the CCSD computer team developed the software tools for HAL, but it was not much publicized within the scientific community. Then, in July 2005, the Académie des Sciences issued a strong recommendation[16] in favour of direct deposit of research communications in Open Archives repositories, asking for adaptation and extension to other disciplines of the ArXiv model which had proved so successful in the fields of physics and mathematics. Official recognition of direct self-archiving, and formal definition of a policy for its development, came in 2006. On 6 July of that year, most of the research councils, CNRS, INRA, INRIA, INSERM, Institut Pasteur, IRD, CEMAGREF, CIRAD, the Conference of University

Presidents (CPU) and the Conférence des Directeurs de Grandes Ecoles (CGE), under the patronage of the Ministry of Education, signed a memorandum of understanding for *'a co-ordinated approach on a national level to open archiving of scientific output'*. The memorandum aimed at the development of a common platform, for self-archiving of documents, either directly or through interfaces at each institution. The system is intended to be open to new members, research or higher education institutions. The memorandum was presented at a press conference[17] at the Académie des Sciences, on 11 October 2006. The heads of CNRS and INSERM had already sent a strongly worded letter to laboratory directors, requesting that all the scientific outputs of their staff be self-archived in open archives.

At present, from the ministry's records[18] and from the Archives-Ouvertes portal[19] run by CCSD, which the author has cross-checked with ROAR and DOAR data, there are about forty active repositories in France, all of which are OAI-PMH compliant; they are listed in the Appendix, updated September 2007. About 60,000 full-text records can be classified as 'original' entries (articles, reports, theses, excluding databases, e-journals and the BNF Gallica collection), of which 49,000 are stored on the HAL platform (see below). These figures do not include the e-publishing portals and the two astronomy and crystallography databases which are also listed by ROAR. An overview is presented in a INRA report[20], prepared as a decision aid towards creation of the institutional repository.

The HAL System

From the figures given above, it is clear that the HAL archives are dominant in France. HAL began around 1998 as a software tool, designed to emulate ArXiv with some added features. Its growth, and extension to disciplines other than physics, led to the creation of autonomous portals, interconnected into a single platform capable of serving all French research institutions. The rationale for HAL was presented[21] at the 2007 Brussels Conference on Scientific Publishing in Europe. A detailed description[22, 23] is also given by Daniel Charnay, Director of CCSD . More information is available on HAL homepage[24].

A single repository

All records are stored in a single database – accessed from the HAL 'generic' portal hosted at CCSD, in Lyon, on the computers of the IN2P3 computing centre. The architecture allows the

creation of subsets, which appear s independent portals, either thematic or institutional. At a national level, research agencies, such as CNRS, IN2P3, INRIA and INSERM have large collections of records; other signatories of the Memorandum are now building their own portals. The trend is less marked with universities or schools; fewer than ten are currently using HAL, including those few which had already built their own repositories and have since migrated to the new system. However, the landscape is changing rapidly. Besides the 'generic' portal, where most entries in natural science and engineering are deposited, thematic portals - from the sciences of education and communication to Basque linguistics - are now active; the most heavily used are the HAL-HSS portal and the TEL theses repository. Also, each institution which creates its own portal can set its own rules and criteria –conforming to the HAL generic standard- for accepting and displaying contributions, to take into account the cultural diversity between disciplines. HAL is open; research institutions from other European countries are invited to join, to build a common system.

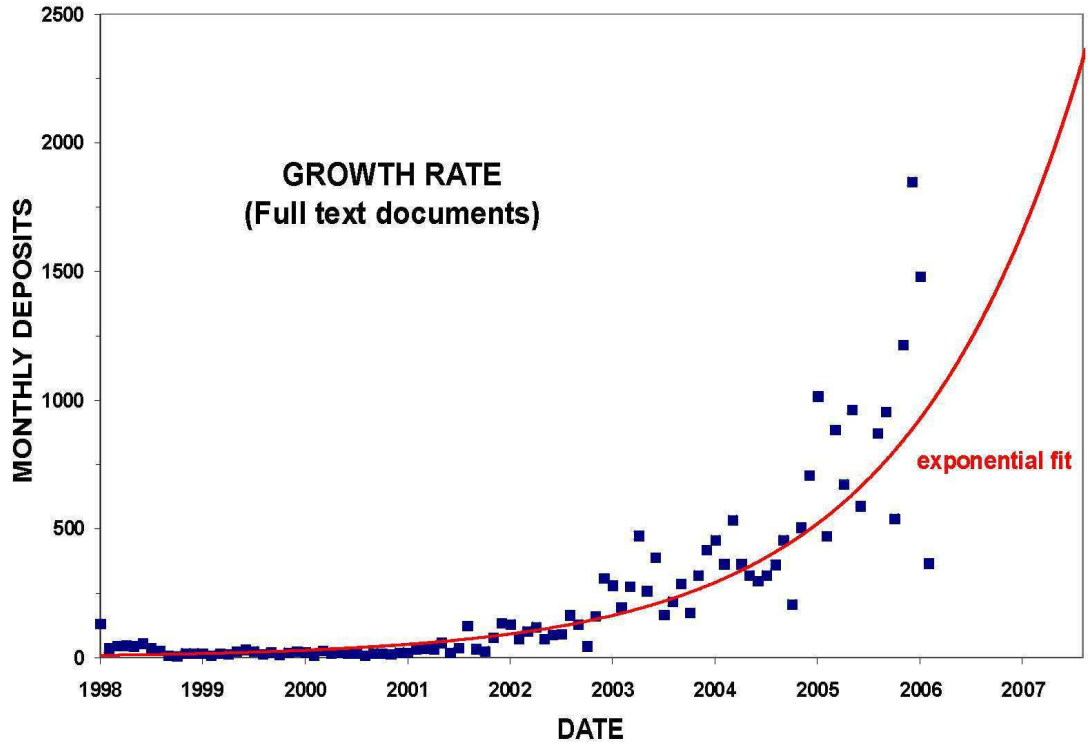

Figure 1 Growth rate of HAL deposits
(@CCSD-CNRS with permission)

The rate of deposit shows a steady, almost exponential, increase, doubling every year (Figure 1). An estimated 10% of the total French scientific output as currently deposited as full-text documents. At this rate of growth, optimistically extrapolated, the ideal of 100% may be expected around 2010! Figure 2 shows the distribution of deposits between disciplines. As expected, the largest share comes from mathematics and physics, subjects in which researchers are well accustomed to self-archiving, from their long experience with ArXiv. It should be pointed out that a direct transfer from HAL to ArXiv is possible, if the author so chooses, through agreement

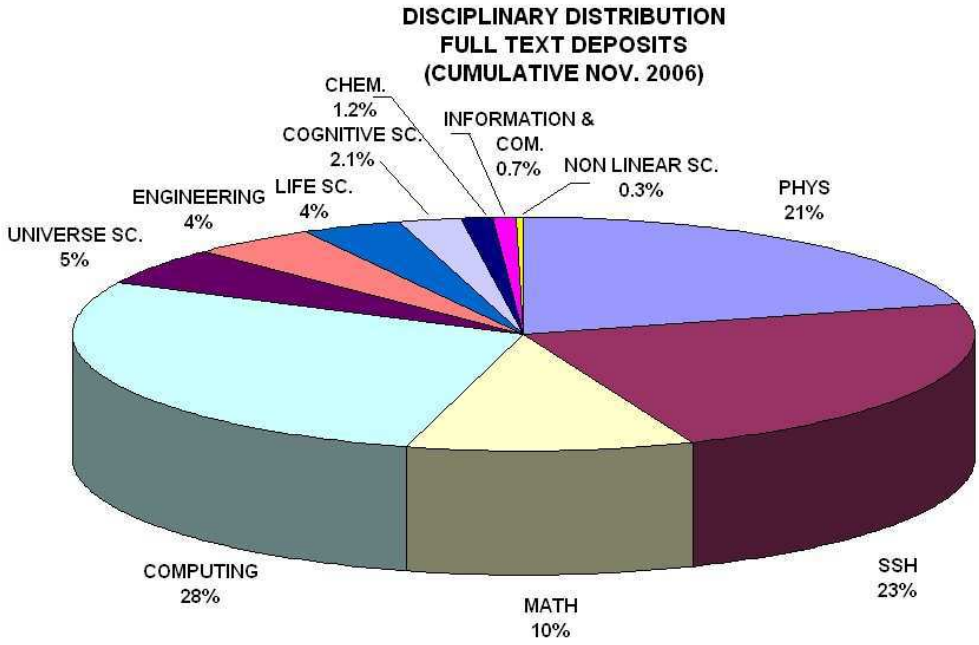

Figure 2 Disciplinary distribution of records on HAL
(@CCSD-CNRS with permission)

and direct links between the two databases. The rise of HSS contributions is interesting; the evident lack of interest in chemistry and in life sciences, disproportionate with their share of French research, is intriguing. However, for life sciences and medicine, the recent opening (2006) of a portal for INSERM (http://hal.inserm.fr/), the French medical research agency, may bring a change. HAL-INSERM features an automatic transfer of contributions to PubMedCentral, which should be attractive. There are not yet enough data, but the present evidence suggests a rise in the life sciences sections of HAL-generic, which, for unclear reasons, are presently preferred to HAL-INSERM. The low uptake in chemistry and life sciences is not well understood either, it

does not seem to be peculiar to France. Some have attributed it to the publishing policy of societies such as American Chemical Society, and to a concern about proprietary industrial rights protection in academic laboratories which are engaged in partnership with chemical and pharmaceutical companies.

Centralised or local archives?

The choice of a centralised system goes against the doctrine of distributed, local, repositories, as advocated by a number of Open Archives proponents[25]. This departure from the 'Harnadian' orthodoxy has historical and practical reasons. French politics, for centuries, has tended towards centralisation; in recent decades, some power was yielded to provincial or local bodies, but universities have received only token autonomy, with inadequate resources. Short of this long awaited reform of university governance, it will prove difficult to operate and maintain a comprehensive database of research outputs at the local level in the long term. Another French idiosyncrasy is the historical accumulation of administrative strata, which leads to a very complicated (and un-Cartesian!) system. A research unit may have administrative dependencies on a number of different institutions: the local university which owns the buildings; other universities which are associated with the operation of the laboratory; research councils, CNRS, INSERM, etc. as the main funder and employer of some of the staff, and so on. This system of multiple allegiances, nevertheless, has its own advantages - during the 1950-70 reconstruction period, it prevented isolation of research units within weak institutions - but now it is proving cumbersome. For a single article, an author might need to comply with the rules of three or more administrations. CNRS, the most powerful research organisation in France, decided not to wait for reform, but instead to create its own archiving system, through the CCSD; it was rapidly joined by other research councils, universities and schools in the memorandum of 2006 mentioned above. A researcher does not have to post his papers in the many repositories of the institutions to which he reports; a single central deposit suffices.

Thus, within HAL the dilemma of local versus central or thematic archives vanishes. As discussed above, the system permits the creation of subsets, which can be used as portals for an institution, or as thematic portals. Moreover, any user is enabled to create his own collection of records with his personal criteria. The task of maintaining the computers, with a skilled team, is transferred to a common unit, well resourced through a scaling effect. Researchers or librarians

retain the valuable task of preparing, formatting and posting their own institution's outputs.

Similar approaches, with a nationwide entry portal, are currently being developed elsewhere , in Sweden and Norway (DIVA)[26], UK (Depot)[27], the Netherlands (DARE)[28]. The French approach is top down, where the central platform, HAL, creates local archives within its large database, while in the other systems, local institutional archives are collected to emulate, through links, a common database.

Defining the contents

> *'HAL is a tool for direct scientific communication between academics. A document deposited in HAL will not be subjected to any detailed scientific evaluation…; but it should, however, be of sufficient quality to rate submission for publication in a specialized scientific journal.'*

These words, from the presentation of HAL on its website, have been misinterpreted by some critics as the end of peer review. A more careful reading shows that this does not exclude the normal process of peer review, which continues to be much prized by scientists. The role for the archive is here defined as another communication tool, comparable to direct correspondence, an entry is only subjected to *'a rapid overview, to ensure that it does indeed fall within the category defined above*'. As in other archives, besides published articles (postprints) and manuscripts submitted for publication in peer-reviewed journals (preprints), different types of documents can be posted: contributions to conferences, reports, book chapters, etc., together with their bibliographic and other metadata-. The description of the server as a 'preprint server' now looks like a misnomer! The record is date-stamped and cannot be changed or withdrawn; successive versions are stored in the database, and only the most recent one is displayed by default. If the document was published in a peer-reviewed journal, only the final file - author's or publisher's version, depending on the license - will appear. To retract a previously posted entry, the author must deposit a null version in its place, either a blank document or an explanation of the reason for retraction. However, each portal has its own policy; HAL-INSERM only accepts articles which have been published or accepted for publication, following the policy of PubMedCentral, because of the exchange agreement between the two servers. For physics and mathematics, there are no such restrictions in HAL-generic, following the policy of ArXiv. If the publisher has set an embargo period, the author can deposit only the metadata, or use a delayed access mechanism, whereby the full text is stored, but displayed only after the required delay. The bibliographical

record with accompanying metadata is always accessible.

The HAL system also benefits from a range of tools which have been developed for full-text retrieval, for sorting entries and for building personal or institutional catalogues, publication lists, etc. The user is well guided by help pages and tutorials, mostly in French; English versions are in preparation.

Is it mandatory to deposit ?

It is evident that if authors were obliged to deposit their output, or at least bibliographic records (metadata), the rate of deposit, and hence the visibility of new research, would increase. However, there is some reluctance to impose this as researchers are not yet fully convinced. None of the existing French archives currently enforces a mandate, with the possible exception of one or two local departments.

However, the heads of both CNRS and INSERM have taken a positive attitude towards a mandate. In June 2006 the Director General of CNRS wrote to all laboratory directors, commending self-archiving of manuscripts; he used the French term '*inviter*', which may look mild to an outsider, but, in administrative jargon, has a very strong connotation, although it is not legally binding. At INSERM, following the NIH example, a mandate has officially been agreed, although the date of application has been delayed from the end of 2006 to 2008.

The rapid increase in the rate of deposit to the different sections of HAL gives rise to the hope that in the long term, when researchers become fully aware of the benefits from self-archiving, mandating self deposit, in parallel with conventional publishing, will appear normal.

The researcher's point of view

Seminars and conferences held in France during the past year were characterised by a mixture of curiosity and concern from the audience. Would deposit in Open Archives be rated as well as publication in classical, high-impact, refereed journals, even if both modes of communication co-exist? Concern also appeared about publishers' rights, and indeed about the additional work entailed by self-archiving.

However, as the statistics show, deposits are approaching the range - around 15% of total publications - observed elsewhere, with marked differences between fields. In physics and

mathematics, the initiative of ArXiv has led to self-archiving becoming normal, especially in high-energy physics; however, other fields do not follow the same pattern, as shown by Figure 2. What are the reasons? Lack of awareness; conservatism, coupled with gallic individualism – quite paradoxical from people supposed to be at the cutting edge of progress; quest for prestige; satisfaction with the present system of publishing - most journals, in the life and physical sciences, can be accessed freely from the researcher's desk, apparently without constraint, since researchers are blissfully unaware of the huge cost of subscriptions; fear of additional work; concern about impact factors and the citation index. On the other hand, the rise of deposits in HSS is interesting, especially given the fragmented nature of the sector.

In the author's view, a 'positive feedback' loop may be anticipated: when self-archiving spreads, and a consensus will tend towards considering it as the norm. This has more to do with social psychology than with technical or administrative actions! A proactive policy of promoting Open Archives will help, and this is the direction in which French research agencies are heading.

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See also : Pierre Baruch: La diffusion libre du savoir. Accès libre et Archives ouvertes http://archivesic.ccsd.cnrs.fr/sic_00169330/fr/.

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[2] More recently, in February 2007, after the EC Brussels Conference on scientific publishing, the Syndicat National de l'Edition (the French publishers' association) issued a very strong statement, deprecating all forms of OA and especially self-archiving
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